بسم الله الرحمن الرحيم

UNIVERSITY OF KHARTOUM

GRADUATE COLLEGE

MEDICAL & HEALTH STUDIES BOARD

Colorectal polyps in Sudanese patients(A clinico-pathological study)

By: Dr. ELsadig. A. Adam

M.B.B.S (University of Khartoum)

A thesis submitted in partial fulfillment for the requirement of

MD degree in Clinical Pathology (2010)

Supervisor: *Dr. Mohammed. M. Osman*

M.B.B.S, MD clinical pathology

Faculty of Medicine (U of K)

Contents

Chapter One

Introduction and Literature Review

Justifications

O

Chapter Two

Materials and Methods

Chapter Three

Results

Chapter Four

Discussion

Conclusion

References

Appendix

Questionnaire

UNIVERSITY OF KHARTOUM

GRADUATE COLLEGE

MEDICAL & HEALTH STUDIES BOARD

QUESTIONNAIRE

COLORECTAL POLYPS IN SUDANESE PATIENTS

Date:..... - Lab number.....

PERSONAL DATA:

- Name ..... - Sex .....

- Age ..... - Residence .....

- Tribe.....

CLINICAL DATA: -

Presenting symptoms

1- ..... 2- .....

3-..... 4-.....

Location of the polyp .....

HISTOLOGICAL FINDINGS:

Gross specimen description.....

Type of operation .....

MICROSCOPY:

Histopathological type .....

Degree of dysplasia if adenomatous polyp .....

بسم الله الرحمن الرحيم

الآيـــــــــــــــــــــــــة

قال تعالى:

{ وَمَـا أُوتِـيـتُم مِّـن الْـعِـلْـمِ إِلاَّ قَـلِـيـلاً }

صدق الله الـعظيم

سورة: الإسراء
الآية (85)

Dedication

To all members of my family, my extended family, and particularly my father, who is my hero in life.

Acknowledgement

I would like to express my deepest thanks to my supervisor Dr. Mohammed Mohammed Osman, and my co-supervisor Professor Bashir Ibrahim Mukhtar for their patience, continuous guidance, and limitless co-operation through-out this study.

I am also grateful to the members of my family for their indispensable support and encouragement that enabled me to carry out this work.

I wish to thank the Head Department of Histopathology at Soba University Hospital for making the records available for this study.

Thanks also extended to the technicians for their help to get the patients records and histopathological slides.

I wish to thank Mrs. Fadia who performed the statistical analysis and printed out this work.

Finally, I am grateful to every one who helped me in this study.

Abbreviations

APC	Adenomatous polyposis coli
Chap.	Chapter
cm	Centimeter
m	Meter
mm	Millimeter
SPSS	Statistical Package for the Social Sciences

Abstract

Background:

Polyps are common diseases affecting the large bowel with high morbidity both in developed and developing countries.

Design:

This study is cross-sectional archival one.

Setting:

The study was conducted on 160 of Sudanese patients with colorectal polyps during the period from January 2006 to December 2009, at Soba University Hospital, in Sudan. One hundred and twelve (70%) were males, compared with 48(30%) females.

Objectives:

The study had the objectives to review the histopathological patterns of the colorectal polyps, to determine their anatomical locations, and to show the degree of dysplasia within the adenomatous polyps.

Methods:

Data were collected from patients request forms into pre-designed questionnaire with detailed personal, clinical and pathological data. The slides were collected and reviewed by investigator and supervisor. The data were analyzed electronically using computer program , SPSS.

Results:

Sudanese patients share many pathological and epidemiological features of the other countries for colorectal polyps: these include the tendency of the polyps to be located in the distal colon regardless of their histological types. Histological type is age related (P value = 0.000), (hamartomatous common in children, adenomatous, inflammatory and hyperplastic polyps are common in adults). The degree of the dysplasia within adenomatous polyps is related to their size (P value = 0.014), (severe degree of dysplasia within large polyps, mild degree in small polyps).

Conclusion:

The results of the study go well with the findings in the world literature, but we have a lot of missed data regarding history.

We recommended that more studies to be carried out for more evaluation of the clinicopathological characteristics of colorectal polyps.

المستخلص

تعتبر السلائل المخاطية القولونية المستقيمية من الأمراض الشائعة في الدول النامية والمتقدمة.

هذه دراسة استعادية عن السلائل المخاطية القولونية المستقيمية عند المرضي السودانيين ، أجريت الدراسة في (160) حالة ، في مستشفي سوبا الجامعي، في الفترة من يناير 2006م وحتى ديسمبر 2009م.وكان عدد الزكور120(70%)وعدد الإناث28(30%).

هدفت الدراسة إلى معرفة التصنيف النسيجي المرضي للسلائل القولونية المستقيمية،وتحليل موضعها التشريحي،ومعرفة درجة خلل التنسج في السلائل الورمية الغدية.

تمت مراجعة تقارير وشرائح المرضي،ومن ثم تم تجميع البيانات في استمارات استبيان تحوي كل المعلومات الشخصية والسريرية ونتائج الفحوصات السريرية .تمت مراجعة الشرائح بمساعدة المشرف وحللت البيانات باستعمال برنامج SPSS. وكانت نتائج الدراسة كالاتي :

حدوث السلائل المخاطية في الجزء القاصي من القولون،وليس لديه أي ارتباط بالتصنيف النسيجي المرضي(P value = 0.862).وجود ارتباط بين التصنيف النسيجي المرضي وعمر المريض(P value=0.000)،(الورم العابي شائع عند الاطفال، السلائل الورميه الغدية والسلائل الالتهابية وسلائل فرط الاستناج شائعة عند البالغين).وجود ارتباط بين حجم السلائل الورمية ودرجة خلل التنسج (P) value=0.014 ،(كلما كبر حجم السلائل الورمية الغدية ازدادت درجة خلل التنسج).

نتائج الدراسة تتوافق مع النتائج في العالم،ولكن كان عندنا الكثير مـــن البيانـــات المفقودة بخصوص التاريخ المرضي.نوصي بإجراء المزيد من الدراسات بشكل خاص فيمـــا يتعلق بحالة مرضي السلائل المخاطية القولونية المستقيمية.

List of Tables

List of Figures

1-INTRODUCTION AND LITERATURE REVIEW

1-1 Normal Anatomy and Histology

Polyps are a group of diseases affecting the large bowel which comprises the terminal 1 to 1.5 m of the gastrointestinal tract and is divided into the following regions: caecum, ascending colon, transverse colon, descending colon, sigmoid colon, and rectum. The hepatic flexure is at the junction of the ascending and transverse colon, and the splenic flexure is at the junction of the transverse colon and descending colon. The rectum forms the distant 8 to 15 cm of extraperitoneal large bowel that lies within the pelvis and ends at the anal canal. [(1)]

The large bowel wall is composed of four layers: mucosa, submucosa, muscularis propria, and serosa (or in the rectum, perimuscular tissues). The mucosa has three components: epithelium, lamina propria, and muscularis mucosae. The mucosal surface is covered by a single layer of low columnar to cuboidal epithelium into which the crypts of lieberkuhn open, either on the surface itself (the majority) or onto the innominate grooves. This surface epithelium is composed of absorptive cells and goblet cells. Lymphocytes and occasional eosinophils may be present between the surface epithelial cells, which rest on a continuous thin basement membrane. The crypts have a tubular shape, and are arranged parallel to each other. [(2)] Branching of these glands occurs rarely; its presence is usually an indication of an inflammatory disease. It should be distinguished from the cloverleaf-like structure resulting from the opening of several crypts into a single innominate groove.

The crypt epithelium contains mature absorptive cells and goblet cells similar to those in the surface epithelium, but in addition it features immature and undifferentiated precursor cells, endocrine cells predominate at the base of the crypts. As for the small intestine, the precursor cells are progenitors of all other types of epithelial mucosal cells. Paneth cells, identified by their numerous eosinophilic secretory granules, contain lysozyme, epidermal growth factor, and other substances. They are normally present only in caecum and proximal right colon; their occurrence elsewhere in the colon is a sign of metaplasia, usually secondary to chronic inflammation.

The lamina propria contains a few lymphocytes, plasma cells, histiocytes, and mast cells scattered in a network of collagen fibres , smooth muscle bundles, vessels, and nerves. Lymphoglandular complexes are normal structures formed by deep crypt epithelium surrounded by lymphoid follicles that extend from the mucosa through the muscularis mucosa into the submucosa. The pericryptal fibroblast sheath is a collection of fibroblasts or myofibroblasts are located around the crypts and at the most superficial portion of the lamina propria.

The submucosa is composed of loose connective tissue having constituents similar to the lamina propria. It also contains the submucosal plexus of Meissner.

The muscularis propria includes a circular inner layer and a longitudinal outer layer, with the myenteric plexus of Auerbach lying between them. The serosa is composed of a single layer of flattened to cuboidal mesothelial cells and subjacent fibroelastic tissue.

Interstitial cells of Cajal are present scattered throughout the wall, as they are in other portions of the gastrointestinal tract.

The large bowel is supplied by branches of the superior mesenteric artery (from the caecum to splenic flexure) and the inferior mesenteric artery (distal to splenic flexure). The lower portion of the rectum is irrigated by the middle and inferior rectal arteries, which are branches of the internal iliac arteries. [3]

The lymphatic drainage of the colon is mainly through the mesentery into the paracolic groups of lymph nodes located along the marginal vascular arcades. Subsequent stations are the intermediate nodal groups, the central lymph nodes, and entire para-aortic chain. The rectum is drained by the inferior mesenteric artery nodes, the superior haemorrhoidal chain, and the hypogastric and common iliac nodes.

1-2Definition:

A polyp is a tumorous mass that protrudes into the lumen of the gut. Some polypoid lesions may be caused by submucosal or mural tumours. However, as with the stomach and small intestine, unless otherwise specified the term polyp refers to the lesions arising from the epithelium of the mucosa. [4]

Presumably all polyps start as small, sessile lesions without a definable stalk. In many instances, traction on the mass may create a stalked or pedunculated polyp.

1-3 Classification:

In general, polyps are divided into neoplastic and non-neoplastic polyps. [5]

I. Neoplastic polyps:

These are epithelial polyps that arise as a result of proliferation and dysplasia; they are called adenomatous polyps, or adenomas. They are true neoplastic lesions and are precursors of carcinoma.

II. Non-neoplastic polyps:

They are formed as a result of abnormal mucosal maturation, inflammation, or architecture; they do not have malignant potential per se. They include the following:

1. Hyperplastic polyps.
2. Inflammatory polyps.
3. Hamartomatous polyps.
4. Lymphoid polyps.

1-4 Epidemiologies:

Colorectal polyps occur in both males and females and in all age groups, but this depends on the type of the polyp. [6]

1) Hyperplastic polyps:

Hyperplastic polyps represent about 90% of all epithelial polyps in the large intestine. [1] The incidence of hyperplastic polyps is age related, increasing after 40 years of age. In Western World, they may be found in approximately 85% of adult population, whereas in developing countries the incidence may be 20% to 30%. [7]

2) Hamartomatous polyps:

Although hamartomatous polyps occur mainly in the first two decades of life, they are not uncommonly seen in adult life. [8] Frequent colonic polyps seen in children, but approximately one third of the cases occur in adults. [8] The vast majority occurring in children younger than five years. [4]

3) Adenomatous polyps:

Males and females are affected equally by large intestinal adenomas. The prevalence of adenomas varies in different parts of the world. Adenomas are common in Western countries and uncommon in developing countries, prevalence as high as 50% in the former and as low as 5.5% in the later. [9] They are found at autopsy in approximately 30% to 35% of the adult individuals. [10] Blacks have a lower prevalence than whites. [11] Frequency of adenomas is increased with age. [10]

4) Inflammatory polyps:

They are seen in 10% to 20% of cases of ulcerative colitis, and they also be noted in Crohns disease, ischemic colitis, amebiasis and schistosomiasis. [7]

5) Lymphoid polyps:

They occur in all age groups, but lymphoid polyposis is found mainly in young women and it also occurs in immunodeficiency states. [12], [13]

1-5 Clinical manifestations:

Polyps are usually asymptomatic, but may present by:

1- Bleeding per rectum:

Polyps may ulcerate and bleed, bleeding may be macroscopic, or occult in faeces discovered when screening patients presenting with anaemia. Any polyp can present with bleeding, but hamartomatous and adenomatous polyps are the commonest polyps causing bleeding.

2- Intestinal obstruction:

Large polyps may obstruct the lumen of the large bowel, and cause intestinal obstruction, or the proximal part of the colon may invaginate into the distal segment (intussusceptions), and cause obstruction of the colon, it is usually caused by lymphoid polyps in children and hamartomatous polyps in young adults.

3- Change in bowel habit:

Polyps may present as chronic constipation alternating with diarrhea, tenesmus, or sensation of defecation and incomplete defecation if in the rectum.

4- Anal protrusion of the polyp:

Rectal polyps may protrude out through the anal canal.

5- Hypoproteinaemia or hypokalemia:

Rarely, villous adenomas hyper secrete copious amounts of mucoid material rich in protein and potassium, leading to either hypoproteinaemia or hypokalemia.

6- Transformation to adenocarcinoma:

There is strong evidence that adenomas are precursors of invasive colorectal adenocarcinomas. Others are not per se premalignant.

1-6 Pathology of polyps

Hyperplastic polyps:

Hyperplastic polyps are non-neoplastic, benign epithelial proliferation. It is believed that hyperplastic polyps result from decreased epithelial cell turnover and accumulation of mature cells on the surface. They are predominantly located in the rectum, [14] and also

commonly found in the sigmoid colon, but less common in the proximal large intestine.[15] Most hyperplastic polyps are 3 to 6 mm in size, pale, gray sessile nodules. Usually positioned on the tops of mucosal folds. They may occur singly, but more often are multiple.

Although large hyperplastic polyps may rarely coexist with foci of adenomatous change, the usual small, hyperplastic polyp is considered to have no malignant potential. However, the hyperplastic polyps occurring in the setting of the rare hyperplastic polyposis syndrome can harbor epithelial cell dysplasia (adenoma), and hence are considered at risk for carcinoma. The underlying genetic for this syndrome is not known.

Microscopically, they are composed of well formed glands, and crypts lined by epithelial cells, most of which show differentiation into mature goblet or absorptive cells.[16] The delayed shedding of surface epithelial cells and fusion of the crypts creating a serrated epithelial profile and irregular crypt architecture.

Hyperplastic polyps have to be differentiated from serrated adenomas. Serrated adenomas have a serrated pattern similar to that of hyperplastic polyps, serrated adenomas tend to have elongated and dilated crypts and to be more villiform and have more complex branching compared with hyperplastic polyps. Serrated adenomas lack the thickened, subepithelial collagen layer seen in hyperplastic polyps. In serrated adenomas nuclei showing elongation with prominent nucleoli, and an increased nuclear cytoplasmic ratio.[17], [18]

Mixed hyperplastic and/ adenomatous polyps:

These polyps have been defined as containing distinct areas of classic adenoma, hyperplastic polyp, or serrated adenoma, although some investigators have equated this lesion to serrated adenoma, others have used the term admixed hyperplastic/adenomatous polyps for these lesions.

Hamartomatous polyps:

Hamartomatous polyps are malformations of glands and stroma. They can occur sporadically or occur in the setting of genetic syndromes. In children are called juvenile, in adults are called retention polyps. Nearly 80% of the polyps occur in the rectum, [4] but they may occur proximal to sigmoid colon. [19], [20] Juvenile polyps are mainly pedunculated, rarely sessile, and usually smaller than 3 cm in diameter. Retention polyps tend to be smaller than 1 cm in diameter and sessile.

In the past investigators thought single hamartomatous polyp has no malignant potential, but latter studies reported that solitary juvenile polyps (non-syndromic) with areas of adenomatous transformation and even carcinoma, but in rare cases.

Microscopically, hamartomatous polyps consist of cystically dilated and tortuous glands in an inflamed stroma. This classic pattern is readily appreciated at low power, and it should alert the pathologist to the diagnosis. The glands are made up of well-formed mucus-secreting cells that may become flattened and attenuated. In approximately 45% of cases, one can notes pink regenerative epithelial cells similar to those seen in hyperplastic polyps. The stroma usually contains acute and chronic inflammatory cells and granulation tissue.

Rarely, multiple polyps of juvenile type are seen throughout the bowel. This condition, known as multiple juvenile polyposes, can be life threatening and associated with the development of adenomatous polyps and adenocarcinoma of the large bowel, duodenum, stomach or pancreas. Some of the polyps in this disorder have combined juvenile and adenomatous features. It is autosomal dominant.

In Cronkhite-Canada syndrome, a non-hereditary disorder, multiple colorectal polyps of juvenile type are associated with ectodermal changes. Adenomatous changes and colorectal carcinoma may also develop in these patients. [21], [22]

Peutz-Jeghers polyps are hamartomatous polyps that involve the mucosal epithelium, lamina propria, and muscularis mucosa. These hamartomatous lesions may also occur singly or multiply in the Peutz-Jeghers syndrome. This rare autosomal dominant syndrome is characterized by multiple hamartomatous polyps scattered throughout the entire gastrointestinal tract and melanotic and cutaneous pigmentation. [23], [24] Patients with the syndrome have increased risk of developing carcinomas of the pancreas, breast, lung, ovary and uterus.

Cowden disease is an autosomal dominant disorder associated with colonic and small intestinal polyps, breast, and thyroid cancer, facial trichilemmomas, acral keratoses, and oral mucosal papillomatosis. Gastrointestinal polyps are seen in 35% of cases.

Adenomatous polyps:

Adenomatous polyps are neoplastic, and arise from the colorectal epithelium and invariably become elevated above the mucosal surface. These lesions either be sessile or pedunculated, and

single or multiple, When multiple they have a tendency to cluster. A familial predisposition has been detected and found to result from an inherited autosomal dominant gene for susceptibility. Most of adenomatous polyps measure 1 cm in diameter. Adenomatous polyps are distributed rather regularly throughout the large bowel, with 40% found in the right colon, 40% in the left colon and 20% in the rectum. [25], [26]

Microscopically, there is an increase in number of glands and cells per unit area compared to normal mucosa. The cells are crowded, contain enlarged hyperchromatic nuclei and have increased number of mitoses, and some of which may be atypical. The basement membrane is not thickened.

The degree of atypia seen in adenomatous polyps is related to increasing age, number of polyps per patient, size of the polyps and the presence of villous changes. [26] It can be graded into mild, moderated and severe; the latter is equivalent to carcinoma in situ.

Adenomatous polyps are segregated into three subtypes on the basis of epithelial architecture I tubular adenomas: Tubular gland II villous adenomas: villous projections III tubulovillous adenomas: a mixture of the above. Most tubular adenomas are small and pedunculated; conversely, most pedunculated polyps are tubular. Villous adenomas tend to be large and sessile and sessile polyps usually have villous features.

Adenomas should be regarded as foci of intraepithelial neoplasia with the potential to evoke into invasive carcinoma. It is likely that, with the exception of those occurring in ulcerative colitis, most are not all colorectal carcinomas arising in this way. The risk that an adenoma will

underwent malignant transformation depends upon several factors: I size: adenomas less than 1 cm across the hazard is low, above 1 cm the hazard is greater, larger than 4 cm, carcinoma is present. II type: size for size, villous adenomas carries 10 fold risks than purely tubular types. III degree of dysplasia: severe dysplasia with pronounced architectural disturbance of gland formation and cytological abnormalities implies that mucosal invasion is imminent. This advanced form of dysplasia is sometimes referred as carcinoma in situ.

Familial polyposis of the large bowel (polyposis coli) must be segregated from the sporadic adenomatous polyps, despite the fact that microscopic appearance of the individual lesions is indistinguishable by either light or electron microscopic criteria. It is autosomal dominant gene defect. The responsible gene is (APC). [27], [28] the tumours in familial polyposis become manifest much earlier than the usual adenomatous polyp, usually in the second decade of life.

Gardner's syndrome is a related familial condition in which adenomatous polyps of the large bowel are seen associated with multiple osteomas of the skull and mandible, multiple keratinous cysts of the skin and soft tissue neoplasm. The potential for the development of large bowel carcinoma appears to be as high as for familial polyposis.

Turcot's syndrome is the name given to the old combination of colorectal adenomatous polyps and brain tumours, usually of glioblastoma type. This is an entity distinct from familial polyposis, with a recessive pattern of inheritance.

Inflammatory polyps:

Inflammatory polyps, also known as pseudoplyps, represent islands of inflamed regenerating mucosa surrounded by ulceration. Often accompanied by exuberant granulation tissue formation. They are elevated sessile nodules, are often seen in otherwise flat surface, they are typically small and multiple, rarely they may have a filiform configuration, and sometimes they attain giant size, thus raising the clinical and radiographic suspicion of malignancy.

They may be secondary to inflammatory disorders of the intestine. They are seen in 10% to 20% of cases of ulcerative colitis, and they may also be noted in Crohn disease, ischemic disease, amebiasis, and schistosomiasis; in addition, they are seen adjacent to ulcers and at surgical anastomatic sites. In ulcerative colitis and Crohn disease, the polyps are simply raised tags of mucosa and/or submucosa.

Microscopically, inflammatory polyps show caps of granulation tissue overlying epithelial structures, or they may closely resemble early juvenile polyps. If polyps are due to inflammatory bowel disease, the mucosa may show changes of inactive inflammatory bowel disease, or epithelial crypts may show abscesses and an inflamed stroma. If the polyps are secondary to intestinal schistosomiasis, schistosomal eggs are often seen in the mucosa and/or the submucosa. Occasionally, inflammatory polyps can have bizarre stromal changes that mimic sarcoma, in inflammatory polyps, mitoses are rare and atypical mitoses are absent. [29], [30]

Inflammatory polyps secondary to mucosal prolapse:

The entities of inflammatory cap polyposis, inflammatory myoglandular polyp, and diverticular polyp, are thought to be different spectra or stages in mucosa prolapse. [31]

Lymphoid polyps:

Lymphoid polyps are an essential normal variant of the mucosal bumps containing intramucosal lymphoid tissue. They are non-neoplastic, benign, have also been designated as lymphoid hyperplasia, pseudolymphoma, and rectal tonsils. These polyps occur mainly in the rectum. They appear soft, superficial polyps usually covered by an intact, gray, smooth mucosa. They may be single or multiple polyps. Eighty percent are sessile; the remainder is pedunculated.

Microscopically these lesions are located in the mucosa, and submucosa, consisting of prominent lymphoid follicles with active germinal centers. They may distort the muscularis mucosa and even extend to the muscularis externa. In superficial biopsy, they can be incorrectly diagnosed as malignant lymphoma. Local excision is curative.

Lymphoid polyposis:

Occasionally the lymphoid aggregates in the rectum undergo reactive hyperplasia and represent a polypoid appearance (benign lymphoid polyposis), may be the result of viral infection or immunodeficiency. [12], [13], [32]

1-7 JUSTIFICATION

Colorectal polyps affect both males and females; can occur at any age group from children to elderly. They are heterogeneous group of diseases, neoplastic and non-neoplastic, inflammatory, hyperplastic, hamartomatous or adenomatous polyps. Also polyps have many clinical manifestations, bleeding, anaemia, bowel habit change or protrusion through the anal canal. Some of them have high risk for transformation to malignancy. Little information is known about colorectal polyps in Sudanese patients. For all these reasons this study is done to make this gray area clear.

1-8 OBJECTIVES

General objective:

To study the cases with colorectal polyps in the study area from January 2006 to December 2009, with the objective to determine the different clinicopathological features of these diseases.

Specific objectives:

1. To determine the histological types of colorectal polyps among the study population.
2. To determine the anatomical location of colorectal polyps among the study population.
3. To review the degree of dysplasia in adenomatous polyps among the study population.

2- MATERIALS AND METHODS

2-1 Study design:

The study is descriptive retrospective recorded data-based study.

2-2 Study area:

The study was conducted at Soba University Hospital, Department of Histopathology. It is one of the major public hospitals in Sudan, providing nationwide diagnostic, management, training and research services.

2-3 Study population:

Cases diagnosed as colorectal polyps in the Department of Histopathology in the study area, from January 2006 to December 2009.

2-4 Inclusion criteria:

Cases of colorectal polyps with full records and histopathological slides or paraffin wax embedded blocks.

2-5 Exclusion criteria:

Cases with deficient records (missed request forms) or missed histopathological slides and paraffin wax embedded blocks.

2-6 Data collection:

Data were collected from patients request forms into pre-designed questionnaire with detailed personal, clinical and pathological data. The slides were collected and reviewed by investigator &

supervisor to confirm the diagnosis of the polyps, determine the histological type and degree of dysplasia in adenomatous polyps. The slides were done from tissues fixed in 10% formalin for 24 hours or more, handled according to histopathological protocols, embedded in paraffin wax, sectioned by microtome, and stained by haematoxylin and eosin stains.

2-7 Data analysis:

The data were analyzed electronically using computer program, SPSS.

3- RESULTS

The total number of the patients with colorectal polyps during the study period was 167; 7 of them had missed slides and paraffin wax embedded blocks and consequently were excluded from the study. The remainders (160) patients were selected and studied.

3-1 Characteristics of the Studied Patients:

Sex distribution among the study population:

One hundred and twelve patients (70%) were males, compared with 48 (30%) females. Thus, the female to male ratio was 1: 2.3 (Figure 1).

Age distribution among the studied patient:

The age of the studied patients ranged from 3 years to 90 years, 41 of them (27.5%) were children (age group 3 – 16 years), 75 patients (46.9%) were young adults (age group 17-50 years), 37 patients (46.9%) were middle age adults (age group 51 – 70), 4 patients (2.5%) were elderly (age group 71 – 90 years). Thus high frequency of colorectal polyps in young adults, followed by children (Table 1). 38 (59.4%) of the hamartomatous polyps were in children, then 16 (25%) of them occurred in young adults, followed by middle age adults 10 (15.6%) of hamartomatous polyps, no evidence of hamartomatous polyps in elderly group (Table 2). Only one child (2.6%) had adenomatous polyp, while 19 (50%) of the adenomatous polyp were in young adults, 14 (36.9%) of the adenomatous polyp were in middle age group, and 4 (10.5%) of them were in the elderly group (Table 3). 3 (11.5%) of the inflammatory polyps were in children, 19 (73.1%) of the inflammatory polyps were in young adults, 4 (15.4%) of them were in middle age

adults, no inflammatory polyps occurred in elderly studied group (Table 4).

Two (6.7%) of the hyperplastic polyps occurred in children, while 20 (66.7%) of them were in young adults, 8 (26.6%) of the hyperplastic polyps had occurred in middle age group, none of them occurred in elderly. (Table 5). In the studied patients, only one patient had lymphoid polyps, who were 45 years old, and another patient with admixed hyperplastic/adenomatous polyp his age was 60 years.

Statistical analysis approved correlation between the age of the patients and the histological types of the colorectal polyps (P value = 0.000) which was highly significant.

3-2 Distribution of clinical symptoms among studied patients:

The various clinical presentations of the colorectal polyps in the studied group were shown in (Figure 2).

One hundred and twenty six of patients (78.7%) were presenting with bleeding per rectum. Coming second is anaemia which was recorded in 14 (8.8%) cases. Bowel habit change was found in 13 (8.1%) cases, while protrusion of the polyp through the anal canal was in (4.4%) patients.

3-3 Types of operations performed to the study population:

Two modes of operations were used to obtain the specimens from the studied patients. The most frequently used procedure was endoscopic polypectomy in 159 (99.4%) cases, while colon resection operation was done on only one (0.6%) patient.

3-4Anatomical location of the colorectal polyps:

Most of the polyps were located in the distal colon (descending colon, sigmoid colon, or rectum) 149 (93.1%), while 11 (6.9%) polyps were located in the proximal colon (caecum, ascending colon, or transverse colon (Table 6).

Thirty eight (92.1%) of the adenomatous polyps were located in the distal colon, compared with 3 (7.9%) located in the proximal colon. 60 (93.8%) of the hamartomatous polyps were located in the distal colon, while 4 (6.7%) of the hamartomatous polyps were located in the proximal colon. 24 (92.3%) of the inflammatory polyps were located in the distal colon, compared with 2 (7.7%) of them located in the proximal colon. 28 (93.3%) of the hyperplastic polyps were located in the distal colon, while 2 (6.7%) of hyperplastic polyps were located in the proximal colon. In the study population there was only one lymphoid polyp and an other one admixed hyperplastic / adenomatous polyp, both of them were located in the distal colon (Figure 3)

No difference was detected in the anatomical location between the various histological types of the colorectal polyps in the studied patients (P value = 0.862)

3-5 Size distribution among the colorectal polyps in the studied patients:

Ninety two (57.5%) of the polyps had a greater diameter of less than 1 cm, 62 (38.7%) of them had a greater diameter of 1 to less than 3 and only 6 (3.8%) polyps had a greater diameter of 3 to 4 cm (Figure 4).

Nineteen (50%) of the adenomatous polyps had size of less than 1 cm, 13 (34.2%) of them had a size of 1 to less than 3 cm, while 6 (15.8%) of adenomatous polyp had a size of 3 to 4 cm (Figure 5). 20 (31.3%) of the hamartomatous polyps were less than 1 cm in size, 44 (68.7%) had a size of 1 to less than 3 cm and non of the hamartomatous polyps reaching the size of 3 cm in the studied patients (Figure 6). 28 (93.3%) of the hyperplastic polyps had a size of less than 1 cm, 2 (6.7%) of them had a size of 1 to less than 3 cm none of the hyperplastic polyps had a size of 3 to 4 cm (Figure 7). 23 (88.5%) of the inflammatory polyps had a size of less than 1 cm, while 3 (11.1%) of inflammatory polyps had a size of 1 to less than 3 cm, none of them had a size of 3 to 4 cm (Figure 8). There was only one lymphoid polyp which had a size of 0.8 cm and also there was one admixed hyperplasic / adenomatous polyp which had a size of 0.6 cm.

3-6 Histopathological characteristics of colorectal polyps among the studied patients:

Histological types:

Thirty eight (23.8%) of the polyps were adenomatous , 64 (40%) of them were hamartomatous , 26 (16.3%) of the polyps were inflammatory, while 30 (18.7%) of them were hyperplasic polyps, lymphoid polyps was found in only one (0.6%) patient and admixed hyperplasic/ adenomatous polyps was also seen in one (0.6%) patient. Thus, hamartomatous polyps had high frequency followed by adenomatous polyps. (Table7).

Histological subtypes:

Thirty eight (59.4%) of the hamartomatous polyps were juvenile while 26 (40.6%) of them were retention polyps (Figure 9). 5 (19.2%)

of the inflammatory polyps were due to Bilharziasis, while one (3.8%) of them was due to inflammatory bowel disease, the majority 20 (77%) of the inflammatory polyps were due to chronic non specific inflammation (Figure 10). 20 (52.6%) of the adenomatous polyp were tubular subtype, while 5 (13.2%) of them were villous adenomas and 13 (34.2%) of the adenomatous polyps were tubulovillous (Figure 11).

3-7 Degree of dysplasia in adenomatous polyps among the study population:

Nine (23.7%) of the adenomatous polyps were of mild degree of dysplasia, 21 (55.3%) were of moderate degree of dysplasia, while 8 (21%) of them were of severe degree of dysplasia (Table 8).

(Figure 12) shows the degree of dysplasia in the various histological subtypes of the adenomatous polyps. 6 (30%) of the tubular adenomas were of mild degree, compared to 9 (45%) of the tubular adenomas were of moderate degree, while 5 (25%) tubular adenomas were of severe degree.

Villous adenomas in the study population did not show any mild degree of dysplasia, while one (20%) villous adenoma was of severe degree. 3 (23.1%) of the tubulovillous adenomas were of mild degree, 8 (61.5%) of them were of moderate degree, while 2 (15.4%) of the tubulovillous adenomas were of severe degree of dysplasia. Statistical analysis did not approve correlation between the histological subtypes of the adenomatous polyps and their degree of dysplasia (P value = 0.403)

Seven (77.8%) of the mild degree adenomas had a size of less than 1 cm, 2 (22.2%) of the mild degree adenomas had a size reaching 3 cm. 6 (28.6%) of moderate degree adenomatous polyps had a size of less

than 1 cm, while 9 (42.8%) of the moderate degree adenomas had a size of 1 to less than 3 cm compared to 6 (28.6%) of them were with a size of 3 to 4 cm. 6 (75%) of adenomatous polyp with severe dysplasia had a size of less than 1 cm, compared to 2 (25%) of them had a size of 1 to less than 3 cm, none of the severely dysplastic polyps had a size reaching 3 cm. Statistical analysis approved correlation between the size of the adenomatous polyps and their degree of dysplasia (P value = 0.014) which was highly significant (figure 13).

Table 1: Age distribution of the study population

Age group (Years)	Frequency	Percentage
3 – 16	44	27.5
17 – 50	75	46.9
51 – 70	37	23.1
71 – 90	4	2.5
Total	160	100.0

Table 2: Age distribution among patients with hamartomatous polyps

Age group (Years)	Frequency	Percentage
3 – 16	38	59.4
17 – 50	16	25
51 – 70	10	15.6
71 – 90	0.0	0.0
Total	64	100.0

Table 3: Age distribution among patients with adenomatous polyps

Age group (Years)	Frequency	Percentage
3 – 16	1	2.6
17 – 50	19	50
51 – 70	14	36.9
71 – 90	4	10.5
Total	38	100.0

Table 4: Age distribution among patients with inflammatory polyps

Age group (Years)	Frequency	Percentage
3 – 16	3	11.5
17 – 50	19	73.1
51 – 70	4	15.4
71 – 90	0	0.0
Total	26	100.0

Table 5: Age distribution among patients with hyperplastic polyps

Age group (Years)	Frequency	Percentage
3 – 16	2	6.7
17 – 50	20	66.7
51 – 70	8	26.6
71 – 90	0	0.0
Total	30	100.0

Table 6: Site distribution of the colorectal polyps:

Anatomical location	Frequency	Percentage
Proximal colon	11	6.9
Distal colon	149	93.1
Total	160	100.0

Table 7: Histological types of the colorectal polyps in the study population

Histological type	Frequency	Percentage
Adenomatous	38	23.8
Hamartomatous	64	40
Inflammatory	26	16.3
Lymphoid	1	06
Hyperplastic	30	18.7
Admixed hyperplastic adenomatous	1	06
Total	160	100

Table 8: Degree of dysplasia in adenomatous polyps among the study population:

Degree of dysplasia	Frequency	Percentage
Mild	9	23.7
Moderate	21	55.3
Severe	8	21
Total	38	100

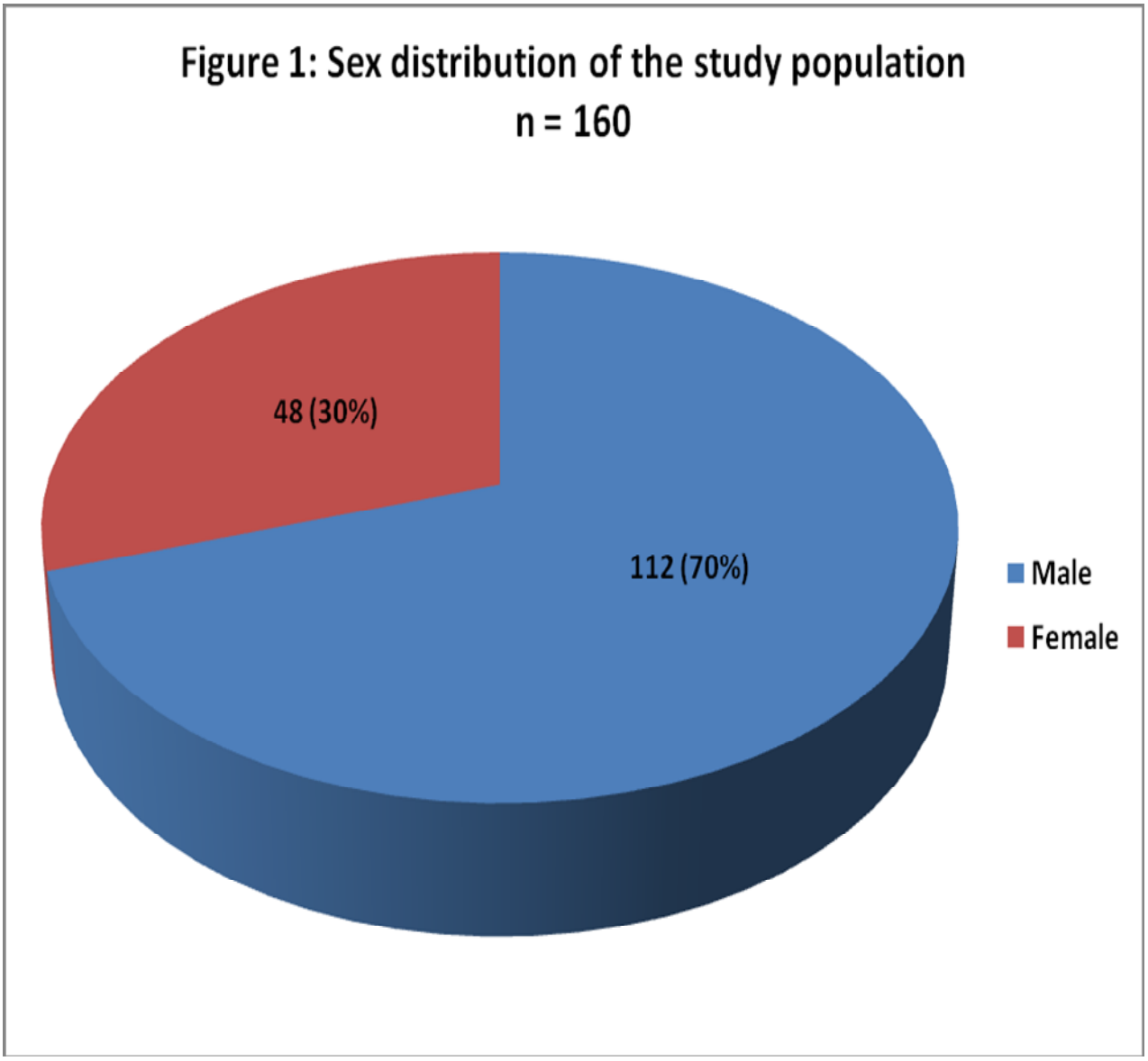
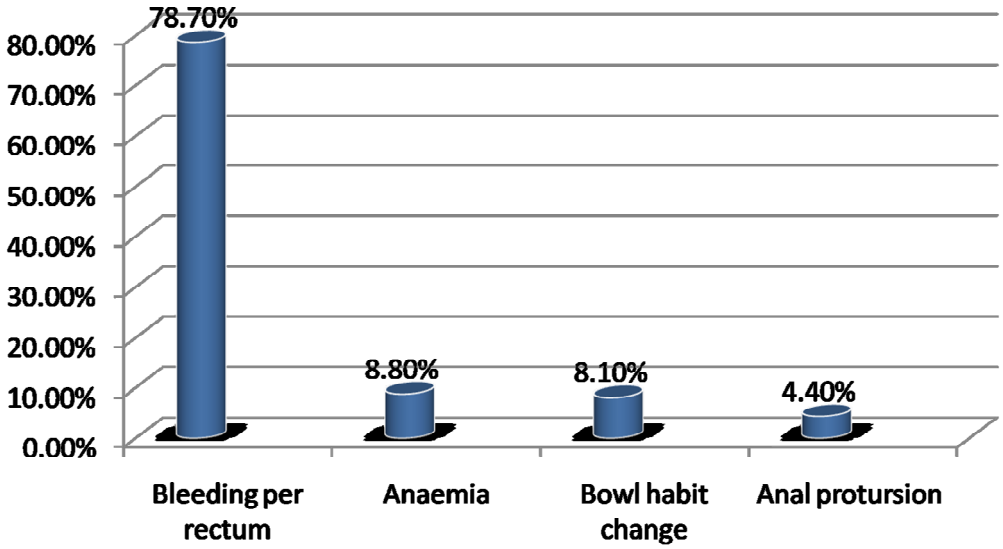


Figure (2):Clinical presentation of colorectal polyps among the study population



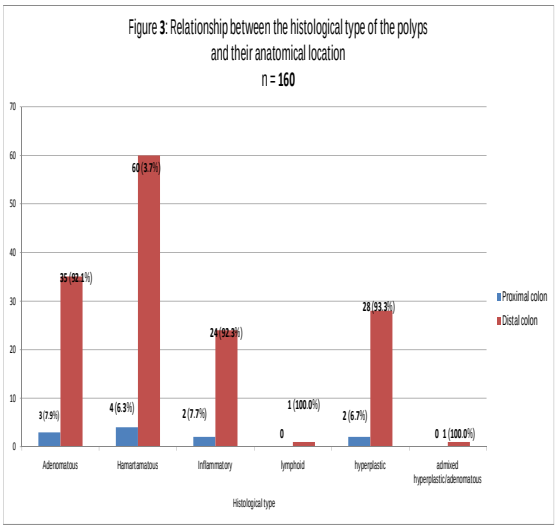
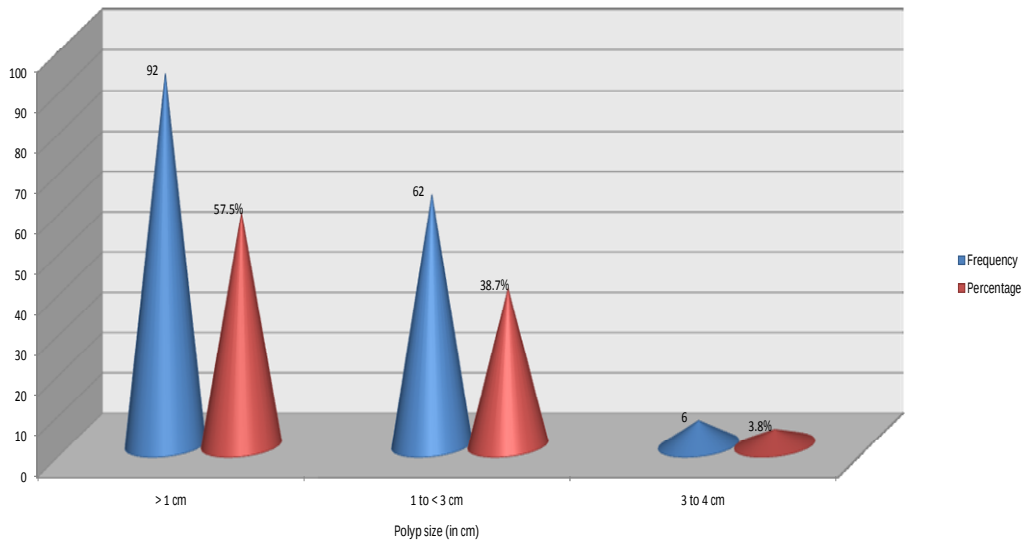


Figure **4**: Size distribution among colorectal polyps in the studied patients
n = **160**



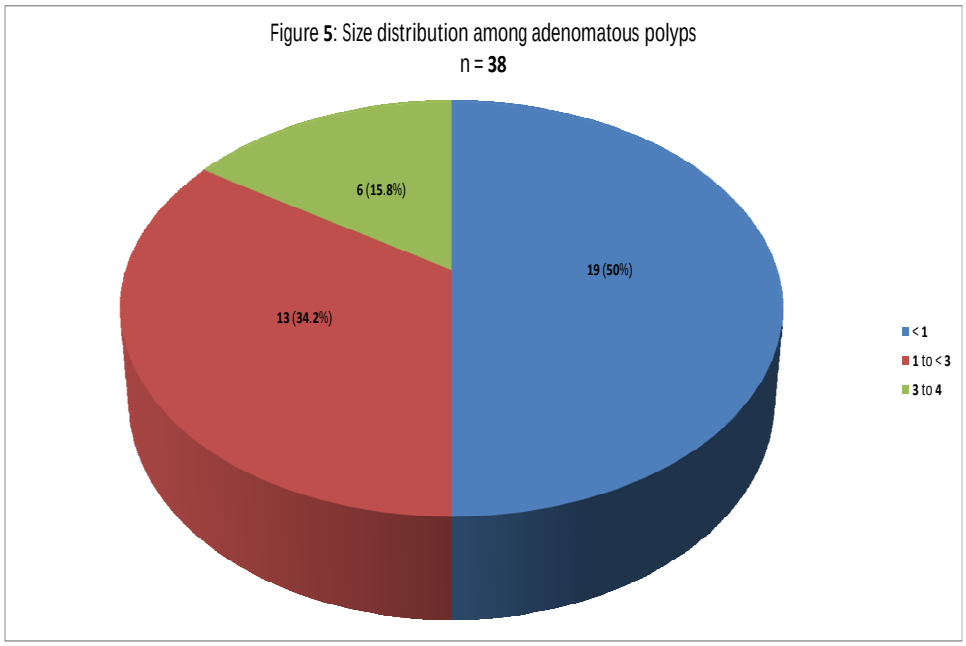


Figure 6: Size distribution among hamartomatous polyps

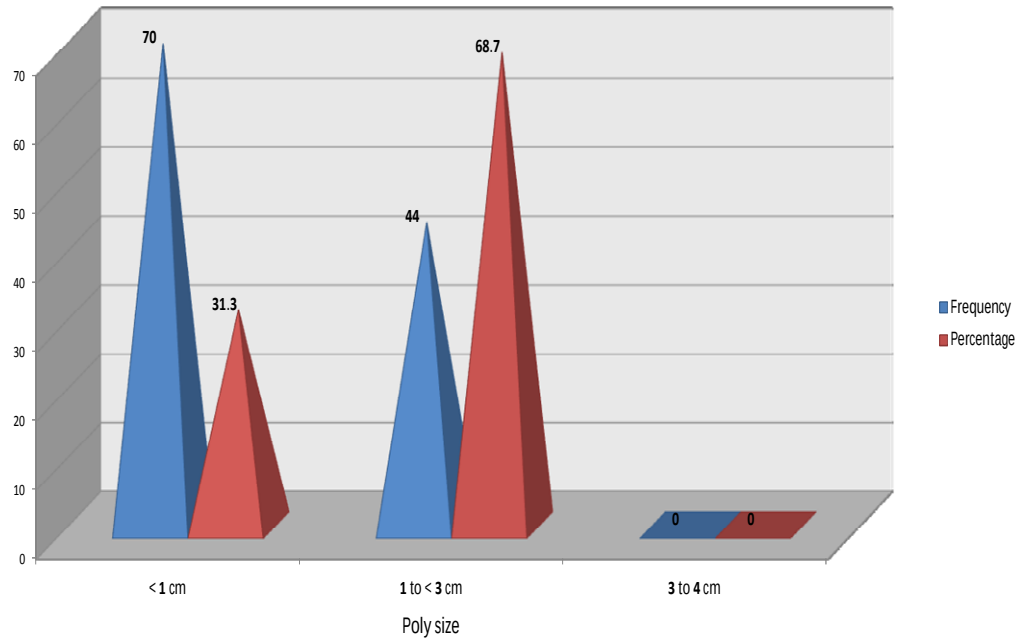
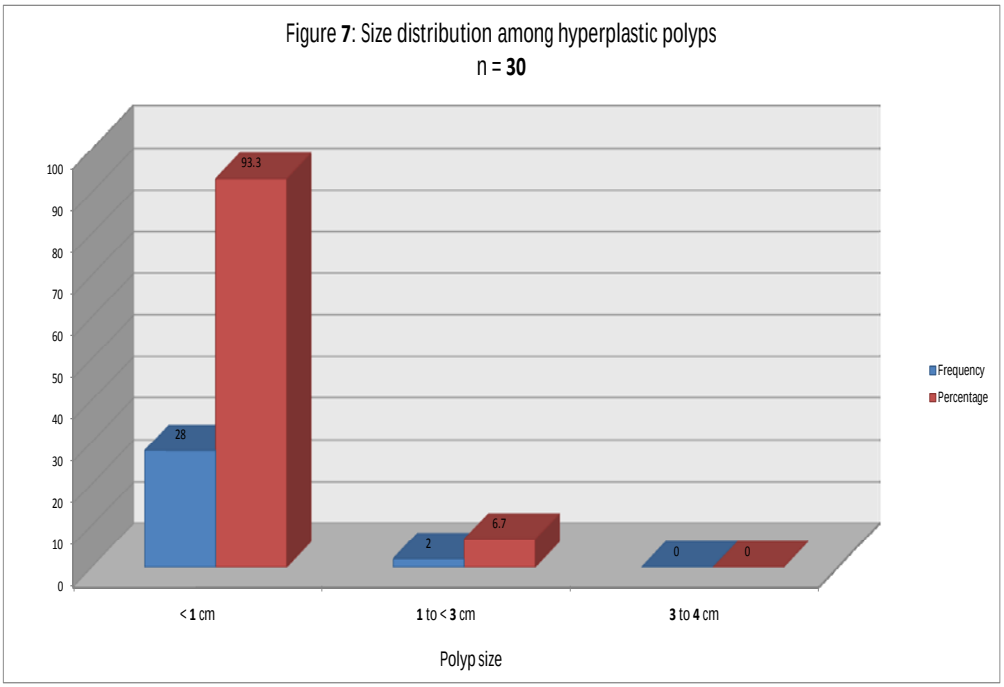


Figure **7**: Size distribution among hyperplastic polyps
n = **30**



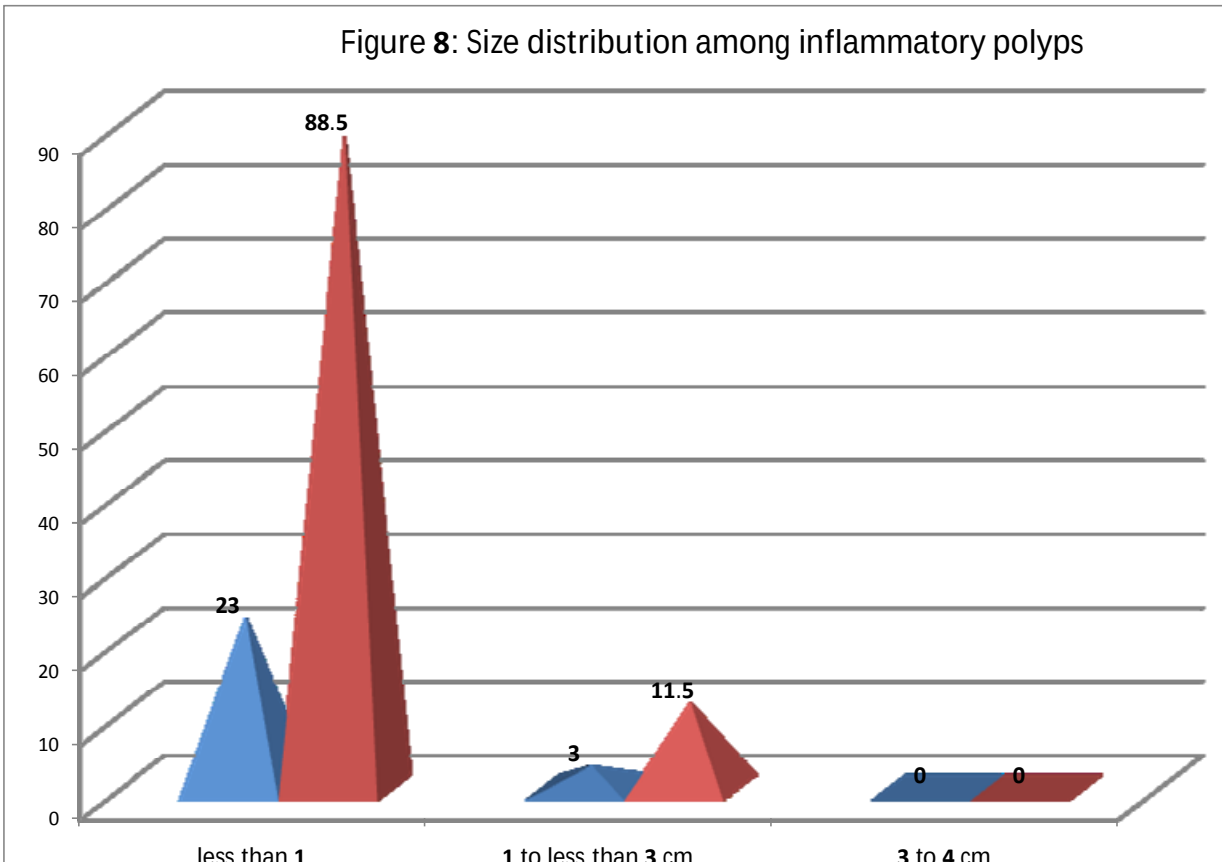
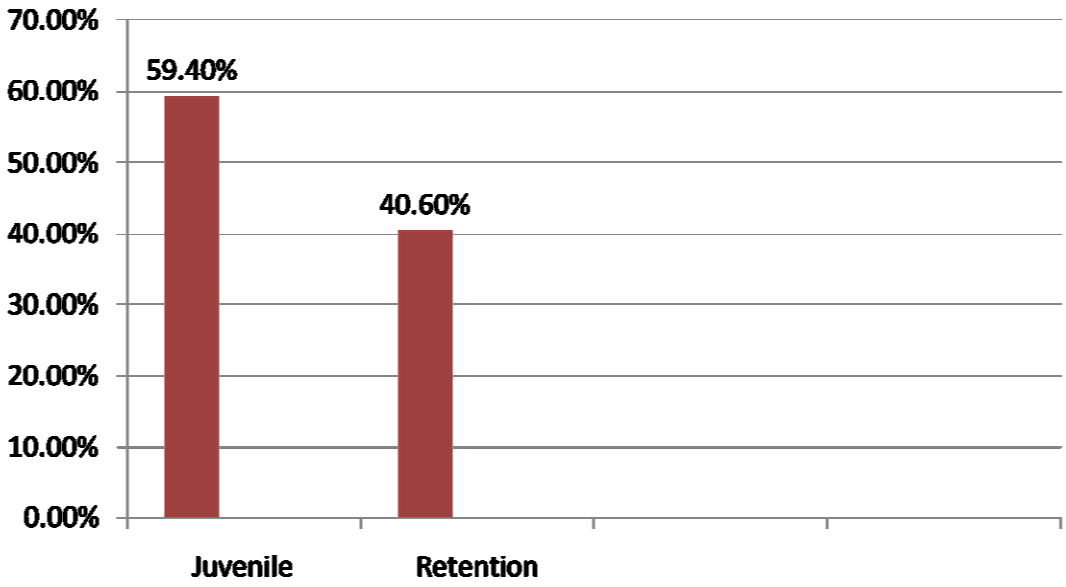


Figure **8**: Size distribution among inflammatory polyps

Figure(9): Subtypes of the Hamartomatous polyps



Figure(10): Causes of inflammatory polyps among study population .

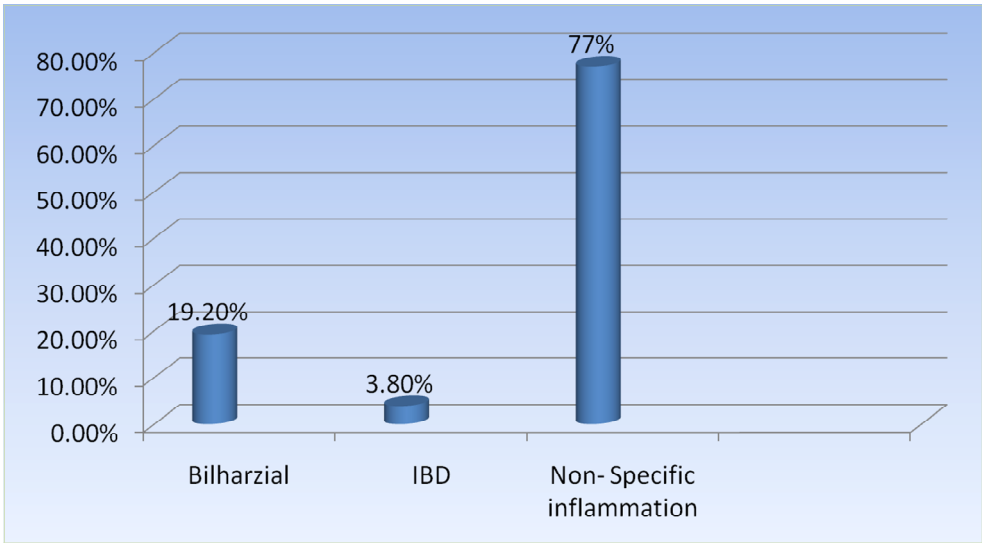


Figure **12**: The degree of dysplasia in the various histological subtypes of the adenomatous polyps among the study population

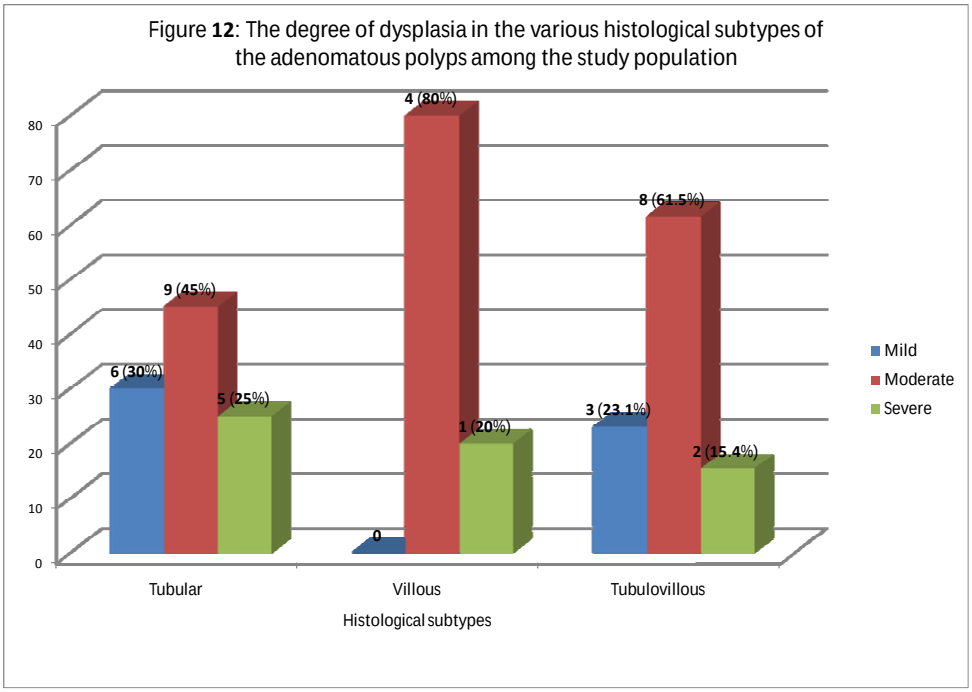
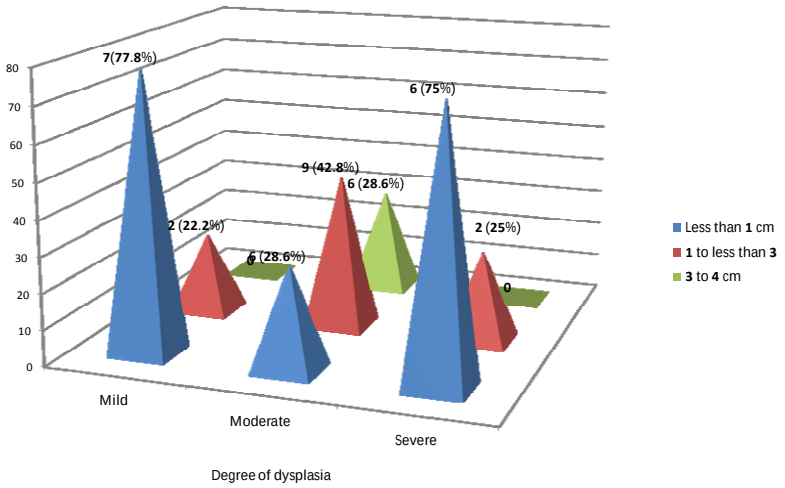


Figure **13**: Relationship between the size of adenomatous polyps and their degree of dysplasia among the study population



4-1 DISCUSSION

This study is a retrospective cross-sectional one addressed to the colorectal polyps in Sudanese patients. It was carried out in the period from January 2006 to December 2009, at Soba University Hospital, and includes analysis of 160 cases, 112 (70%) were males, 48 (30%) were females.

One of the aims of this study was to determine the anatomical location of the colorectal polyps (distal colon versus proximal colon). Most of the various histological types of the polyps (hamartomatous, adenomatous, hyperplastic, and inflammatory) were located in the distal colon. The data indicate that the anatomical location of the polyps is not related to its histological type (P value = 0.862). This consistent with findings by others. [4], [14], [15], [25], [26] There was only one case of lymphoid polyp and another one of admixed hyperplastic/adenomatous polyp, both were located in the distal colon.

This study indicates that histological types of colorectal polyps are age related (P value = 0.000). Hamartomatous polyps had high frequency in children (59.4% of hamartomatous polyps). Adenomatous polyps had high frequency in adults 50% of the Adenomatous polyps were in young adults, 36.8% of them were in middle age adults compared to only 2.6% of Adenomatous polyps were in children. Inflammatory polyps had high frequency in young adults (74% of the inflammatory polyps). Hyperplastic polyps had a high frequency in young adults (66.7% of the hyperplastic

polyps). These results are in agreement with previous studies. [4], [7], [8], [10]

One of the aims of this study was to determine the degree of dysplasia within the adenomatous polyps. The present study indicates that the histological subtypes of the adenomatous polyps are not related to the degree of dysplasia (P value = 0.403). There was no significant difference between the distribution of the histological subtypes within their degree of dysplasia, 30% of the tubular adenomas showed mild degree of dysplasia, 23.1% of the tubulovillous adenomas showed mild degree of dysplasia, and none of the villous adenomas showed mild degree of dysplasia. 45% of the tubular adenomas showed moderate degree of dysplasia, 61% of the tubulovillous adenomas showed moderate degree of dysplasia, and 80% of the villous adenomas showed moderate degree of dysplasia. 25% of the tubular adenomas showed severe degree of dysplasia, 15.4% of the tubulovillous adenomas showed severe degree of dysplasia and 21.1% of the villous adenomas showed severe degree of dysplasia. These results are not in agreement with previous studies. [4]. [26] A possible explanation for this may be due to the limitation of the number of the study population in addition to all patients were from one center.

In this study, the data indicate that Adenomatous polyps size is related to their degree of dysplasia (P value = 0.014). 36.8% of the Adenomatous polyps with a size of less than 1 cm showed mild degree of dysplasia compared with 31.6% of the same size showed moderate degree of dysplasia and 31.6% of them showed severe degree of dysplasia. 15.4% of the adenomatous polyps with a size of 1 to less than 3 cm showed mild degree of dysplasia,

42.9% of the same size showed moderate degree of dysplasia, 25% of the same size showed severe degree of dysplasia, none of the adenomatous polyps with a size of 3 to 4 cm showed mild degree of dysplasia compared with 100% of the same size showed moderate degree of dysplasia. These results are in agreement with previous studies. [4] [26]

4-2CONCLUSION

- Regardless of the limitations of this study, it indicated that our country shares many clinical and pathological characteristics common with other countries.
- These characteristics include the tendency of the colorectal polyps to be located in the distal colon regardless of their histopathological types. Histological types of colorectal polyps are age related (hamartomatous polyps are common in children, adenomatous, inflammatory and hyperplastic polyps are common in adults. The degree of dysplasia within adenomatous polyps is found to be related to their size (mild degree with small size of polyps, severe degree of dysplasia with large sized polyps).
- But the degree of dysplasia within adenomatous polyps is not related to their histological subtypes.
- The study identified six histological types of colorectal polyps, namely:
    - Hamartomatous, lymphoid, adenomatous, admixed hyperplastic/adenomatous, inflammatory and hyperplastic polyps.

4-3 RECOMMENDATIONS

- Further in-depth prospective studies are highly recommended to be carried out in more than one center for more evaluation of the colorectal polyps particularly Polyposis syndromes.
- Improvement of colorectal polyps reporting and registration activities

4-4 References:

1- Ellis. Large intestine. Clinical anatomy, 10th edition. Black well. P83-84, 2002.

2- Moore, Ketith L, et. al. Colon. Clinically oriented Anatomy, 5th edition. Lippinott Williams wilkins. P277- 280, 2006.

3- Juan Rosia, et al. Normal anatomy of the large bowel. Ackerman's surgical pathology, 9th edition. New york Philadelophia. P776-777, 2004.

4- Kumar, Abbass, et al. Tumours of the colon and rectum. Pathologic Basis of disease, 7th edition. Saunders Elsevier. P857-862, 2005.

5- Robert D., John R., et al. polyps of the large intestine. Surgical pathology of the GI Track, Liver, Billiary Tract, and pancreas, second edition. Saunders Elsevier. P482-533, 2004.

6- Chandrasoma. Colorectal polyps and polyposis syndromes. Gastrointestinal pathology, first edition. Asimon & Schuster company. P 313- 338, 1999.

7- Darryl Carter, Victor E., et al. Intestinal neoplasm. Sternberg's Diagnostic surgical pathology, fourth edition. Lippincott Williams & Walkins. Chap. 34. P 1543-1596, 2004.

8- Roth SI, Helwig EB. Juvenile polyps of the colon and rectum. Cancer 1963; 16: 468- 479.

9- Juan Rosia, et al. Epithelial polyps. Akerman's surgical pathology, 9th edition. New york Philadelphia. P 799-810, 2004.

10- Williams AR, Balasooriya BAW, Day DW. Polyps and cancer of the large bowel. A necropsy study in Liverpool. Gut 1982, 23: 853-842.

11- Offerhaus GJ, Giardiello FM, Tersmette KW, Mulder JW, Tersmette AC, Morre GW, Hamilton SR. Ethnic differences in the anatomical location of colorectal adenomatous polyps. Int J Cancer 1991, 49: 641-644.

12- Corres JS, Wallace MH, Morson BC. Benign lymphomas of the rectum and anal canal: a study of 100 cases. J Pathol Bacteriol 1961; 82:371- 382.

13- Venkitachalam PS, Hirsch E, Elguezabal A, et al. Multiple lymphoid polyposis and familial polyposis of the colon; a genetic relationship. Dis Colon Rectum 1978; 21:336-341.

14- Arthur JF. Structure and significance of metaplastic nodules in the rectal muscosa. J Clin Pathol 1968; 21: 735 – 743.

15- Waye JD, Lewis BS, Frankel A, Geller SA. Small colon polyps. Am J Gastroenterol 1988;83: 120-122.

16- Williams GT, Arthur JF, Bussey HJ, Morson BC. Metaplastic polyps and polyposis of the colorectum. Histopathology 1980; 4:155- 170.

17- Torlakovic E, Snover DC. Serrated adenomatous polyposis. Gastroenterology 1966; 110:748 – 755.

18- Longacre TA, Fenoglio-Preiser CM. Mixed hypeplastic adenomatous polyps/serrated adenoma; a distinctive form of colorectal neoplasia, AM J Surg Pathol 1990; 14:524-537.

19- Dajani YF, Kamal MF. Colorectal Juvenile polyps. An epidemiological and histopathological study of 144 cases in Jordanians. Histopathology 1984, 8: 765- 779.

20- Mestre JR. The changing pattern of juvenile polyps. Am J Gastroenterol 1986, 81: 312-314.

21- Daniel ES, Ludwig SL, Lewin KJ, Ruprecht RM, Rajacich GM, Schwabe AD. The Cronkhite-Canada syndrome. An analysis of clinical and pathologic features and therapy in 55 patients. Medicine (Baltimore) 1982, 61: 293-309.

22- Kindblom – L-G, Angervall L, Santesson B, Santesson B, Selander S. Cronkhite- Canada

syndrome. Case report. Cancer 1977, 39: 2651- 2657.

23- Altonen LA, Jarvin NH, Gruber SB. Peutz-Jegher's syndrome. In: Hamilton SR, Aaltonen LA, eds. WHO classification of tumors, pathology, and genetics; tumors of the digestive system. Lyon France: IARC Press, 2000: 74-76.

24- Rustgi AK. Hereditary gastrointestinal polyposis and nonpolyposis syndrome. N Egnl J Med 1994:331: 1694-1702.

25- Arminski TC, McLean DW. Incidence and distribution of adenomatous polyps of the colon and rectum based on 1.00 autopsy examinations. Dis Colon Rectum 1964, 7: 249-261.

26- Konishi F, Morson BC. Pathology of Coloreatal adenomas A colonoscopic survey. J Clin Pathol 1982, 35: 830-841.

27- Burt RW, Bishop DT, Cannon LA, Dowdle MA, Lee RG, Skolnick MH. Dominant inheritance of adenomatous colonic polyps and colorectal cancer. N Engl J Med 1985, 312: 1540-1544.

28- Yonemoto RH, Slayback JB, Byron RL Jr, Rosen RB. Familial polyposis of the entire gastrointestinal tract. Arch Surg 1969, 99:427-434.

29- Shekitka KM, Hewig EB. Deceptive bizarre stromal cells in polyps and ulcers and of the gastrointestinal tract. Arch Pathol Lab Med 1986: 110:833-836.

30- Jessurun J, Paplanus SH, Nagle RB, et al. Pseudosarcomatous changes in inflammatory polyps of the colon. Arch Pathol Lab Med 1986; 110:833- 836.

31- Chetty R, Bhathel PS, Slavin JL. Prolapsed induced inflammatory polyps of the colorectum and anal transitional zone. Histopathology 1993: 23: 63-67.